Table (40) : Comparative evaluation of prepared additives and imported one.

Test	ASTM method	Prepared Additives			Imported additive
		Additive no. (1)	Additive no. (2)	Additive no. (3)	
TBN, mgKOH/ g sample	D 664	500	464	300	498
Ca, %wt	D 5185	17	16.52	10.7	16.9
*sulphated ash, %wt	D 874	57.8	56.17	36.38	57.5
*Detergency	Spot method	93%	90.8%	85%	93.5%
*Dispersive power	**Sedimentation Test**	12	10.4	8.8	13
*Oxidation stability, (min.)	IP229	200	263	300	210
*Copper strip corrosion	D 130	1B	1A	1A	1B
Solubility in oil	-	Completely soluble	Completely soluble	Completely soluble	Completely soluble
Appearance	visible	Clear mass	Clear mass	Clear mass	Clear mass
Colloidal stability, % wt	SMS	1.1	1.3	1.24	1.12

* These tests were done on a blend of 4% additive and 96% base oil 100N, while other tests were done on the pure additive.

* N.B The oxidation stability of base oil 100N is 35 min, Table (12).

Conclusions:

From Table (40) we deduce that

(1) Additives numbers 1 and 2 has Total Base Numbers higher than additive number 3 i.e. Sulphonates have higher base number than Phenates.

(2) Additives numbers 1and 2 has higher detergency and dispersancy i.e. Sulphonates has higher detergent – dispersant properties than Phenates.

(3) Additive number 3 has higher oxidation stability than additives number 1 and 2, i.e. Phenates has higher oxidation stability than Sulphonates.

(4) Additive number 1 has higher detergency and dispersive power than additive number 2, [i.e. longer alkyl group has higher detergency and dispersive power than the shorter one].

(5) Additive 2 has higher oxidation stability than additive 1[i.e. shorter alkyl group gives better surface protection] this due to the long alkyl group which hinder each others.

(6) The imported additive and additive 1 are nearly with the same chemical and performance results.

Table (41) represents final evaluation of prepared additive with imported one.

Table (41) : Final evaluation of prepared additives.

Chemical structure	Longer sulphonates	Shorter sulphonates	Phenates
Neutralization	Excellent	Excellent	V. Good
Detergancy	Good	Excellent	Good
Dispersancy	V. Good	Good	Good
Oxidation stability	Good	V. Good	Excellent

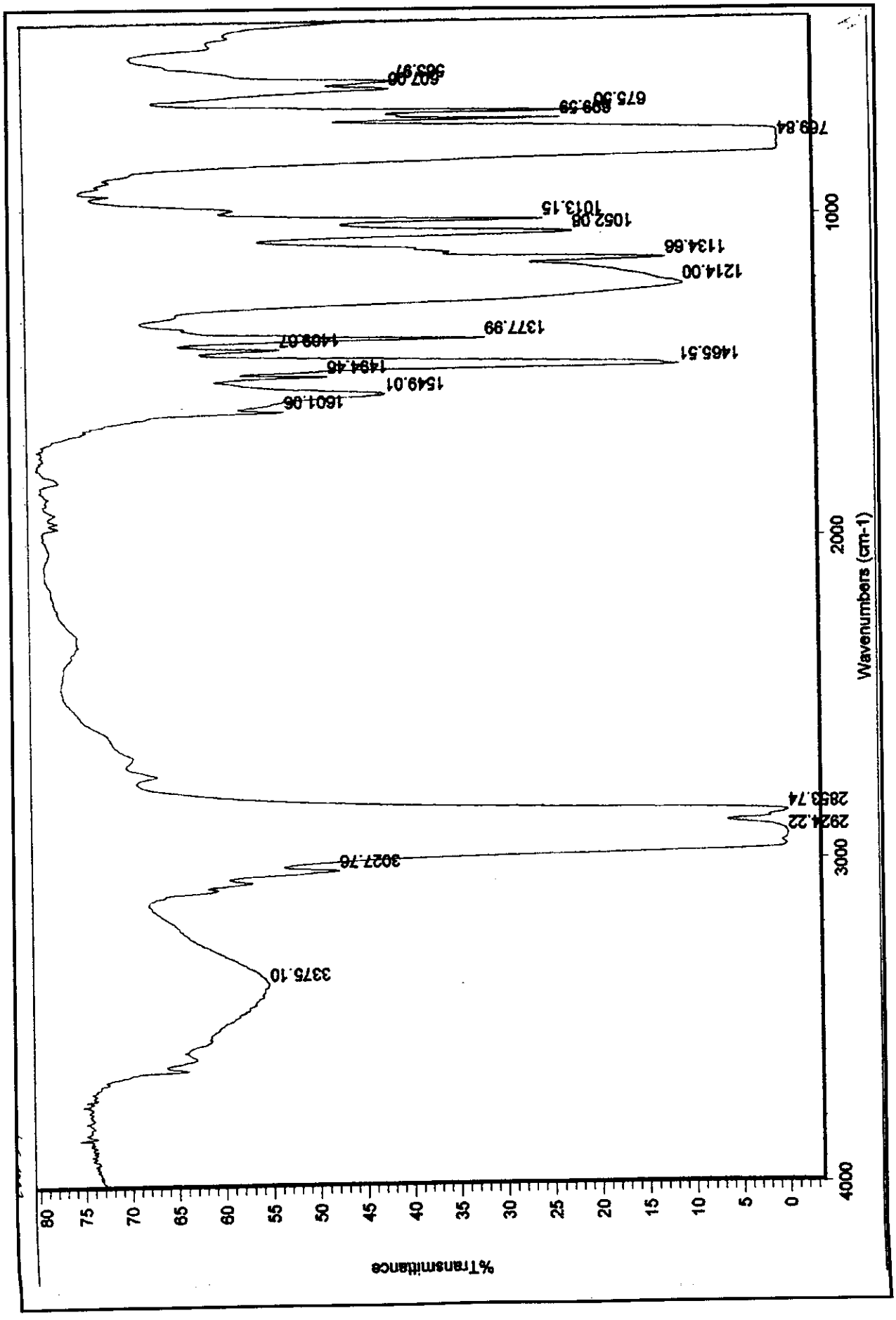

Figure (6) : FTIR Chart of product D

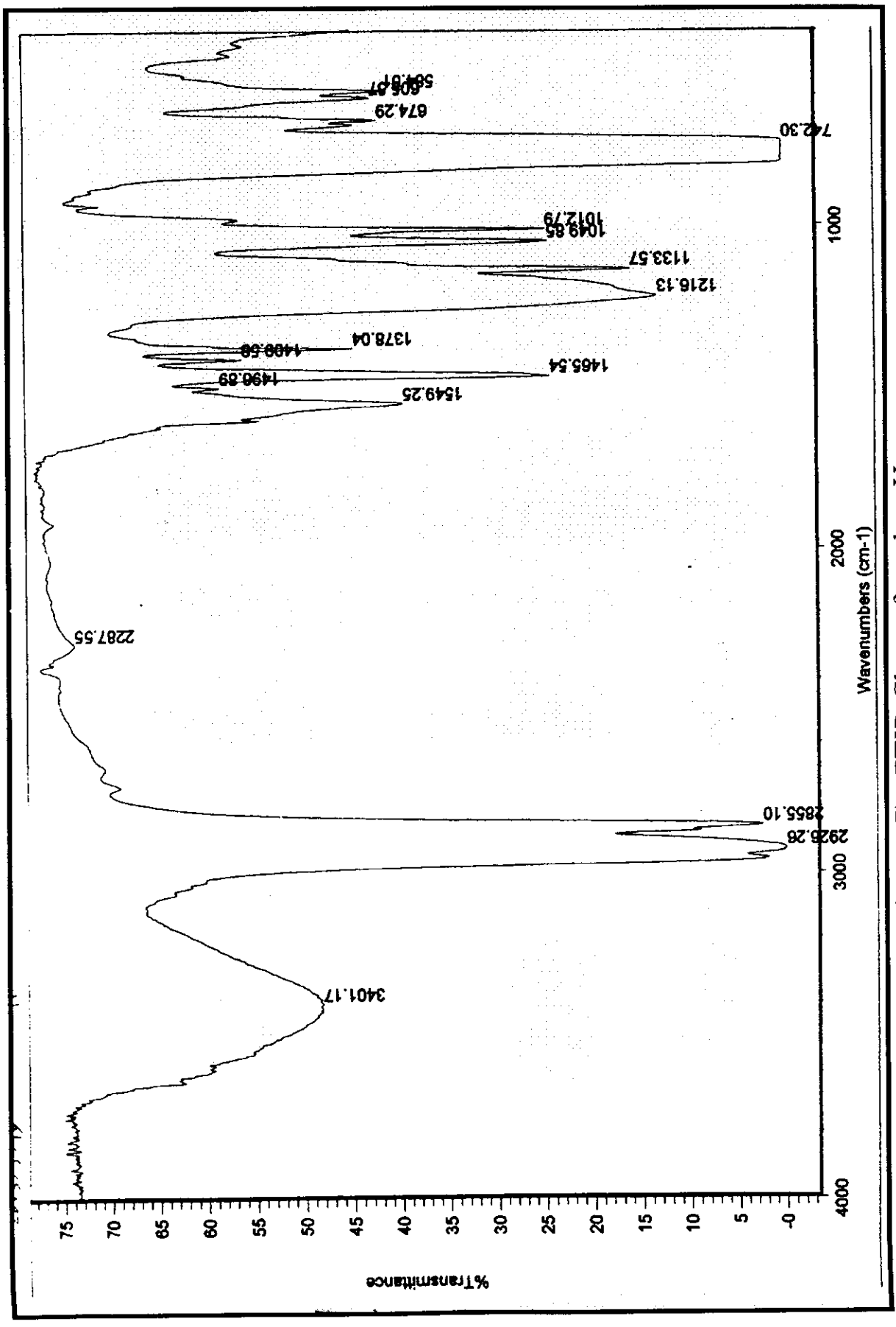

Figure (7) : FTIR Chart of product H

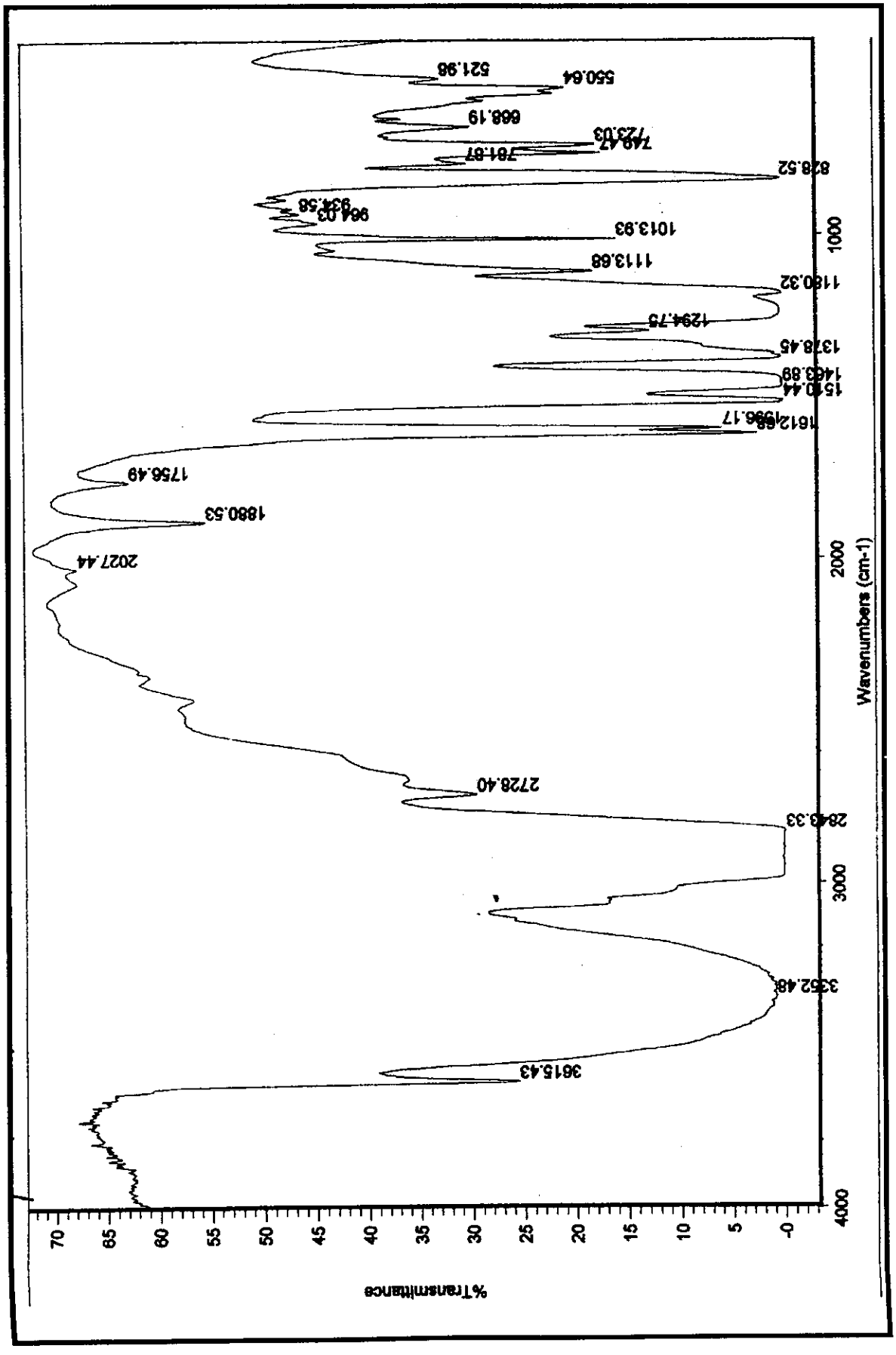

Figure (8) : FTIR Chart of product L

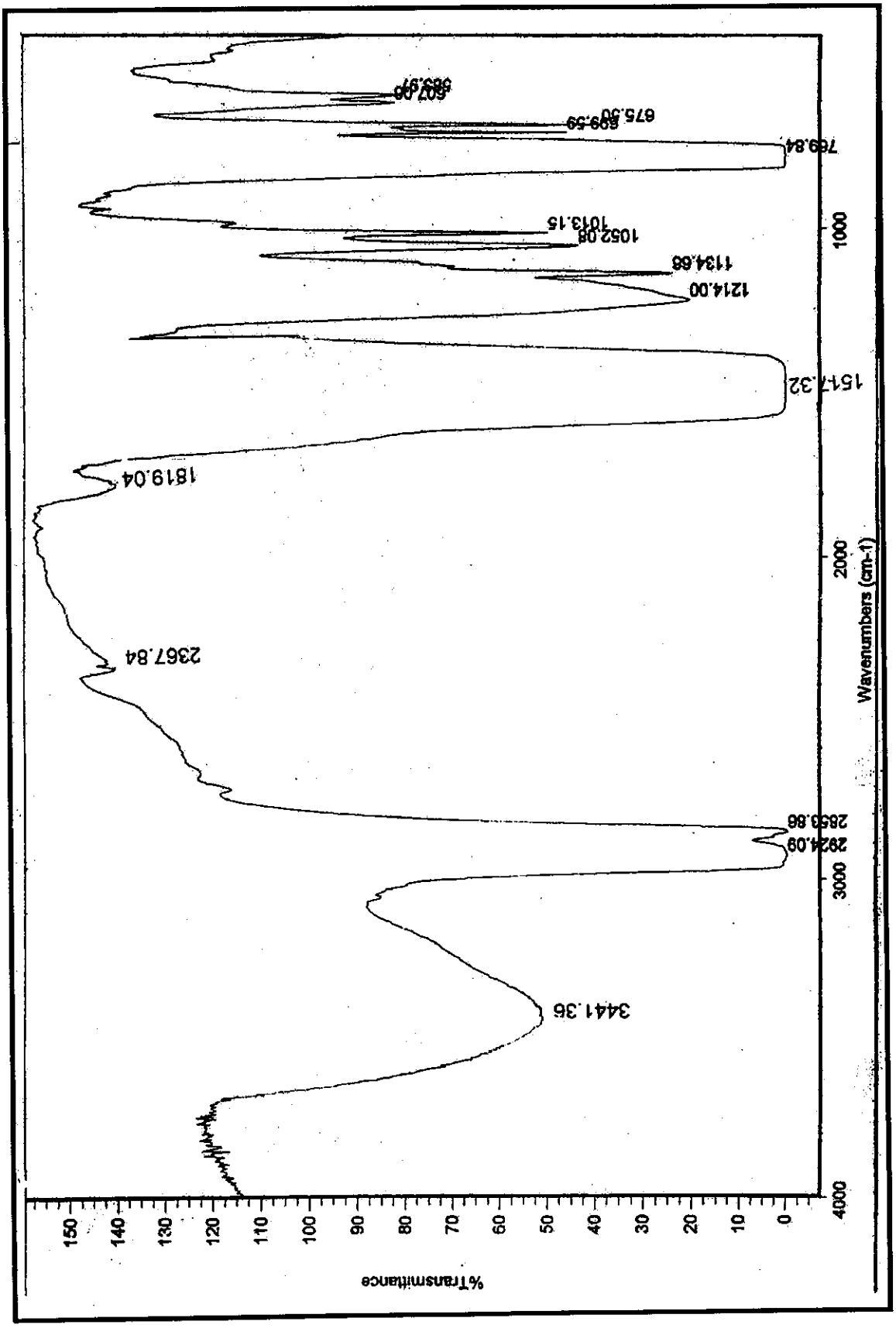

Figure (9) : FTIR Chart of Local additive number 1

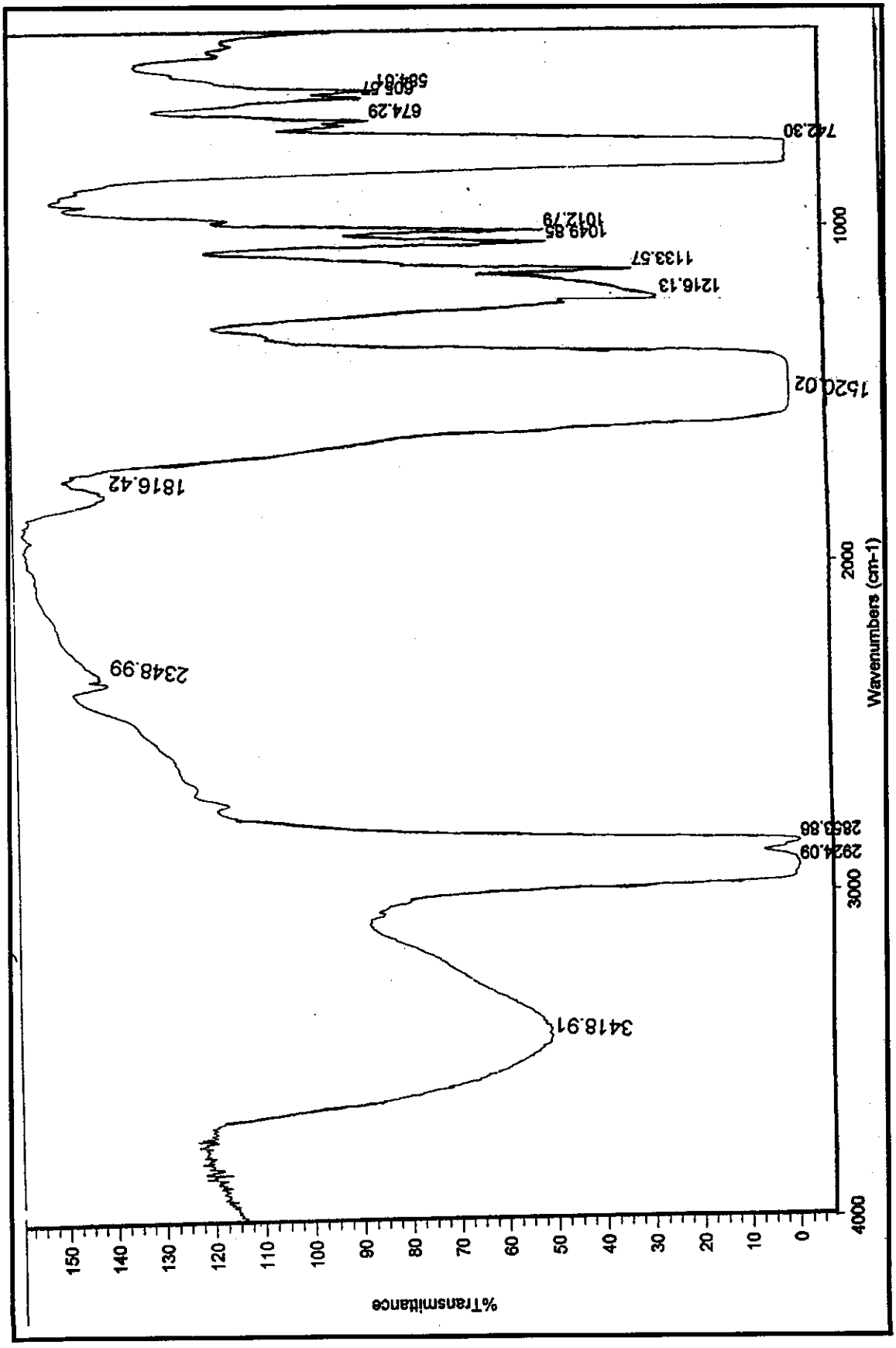

Figure (10) : FTIR Chart of Local additive number 2

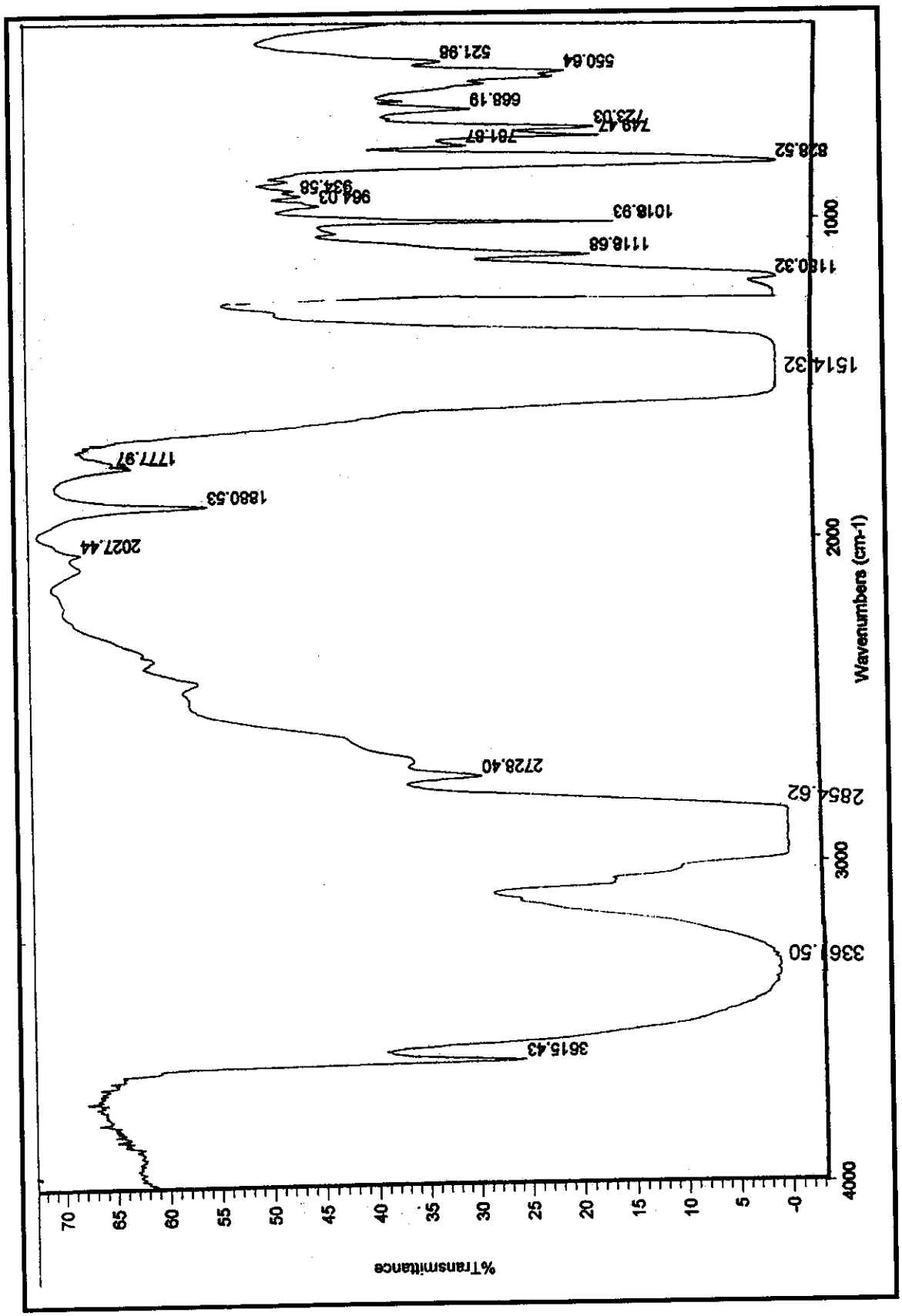

Figure (11) : FTIR Chart of Local additive number 3

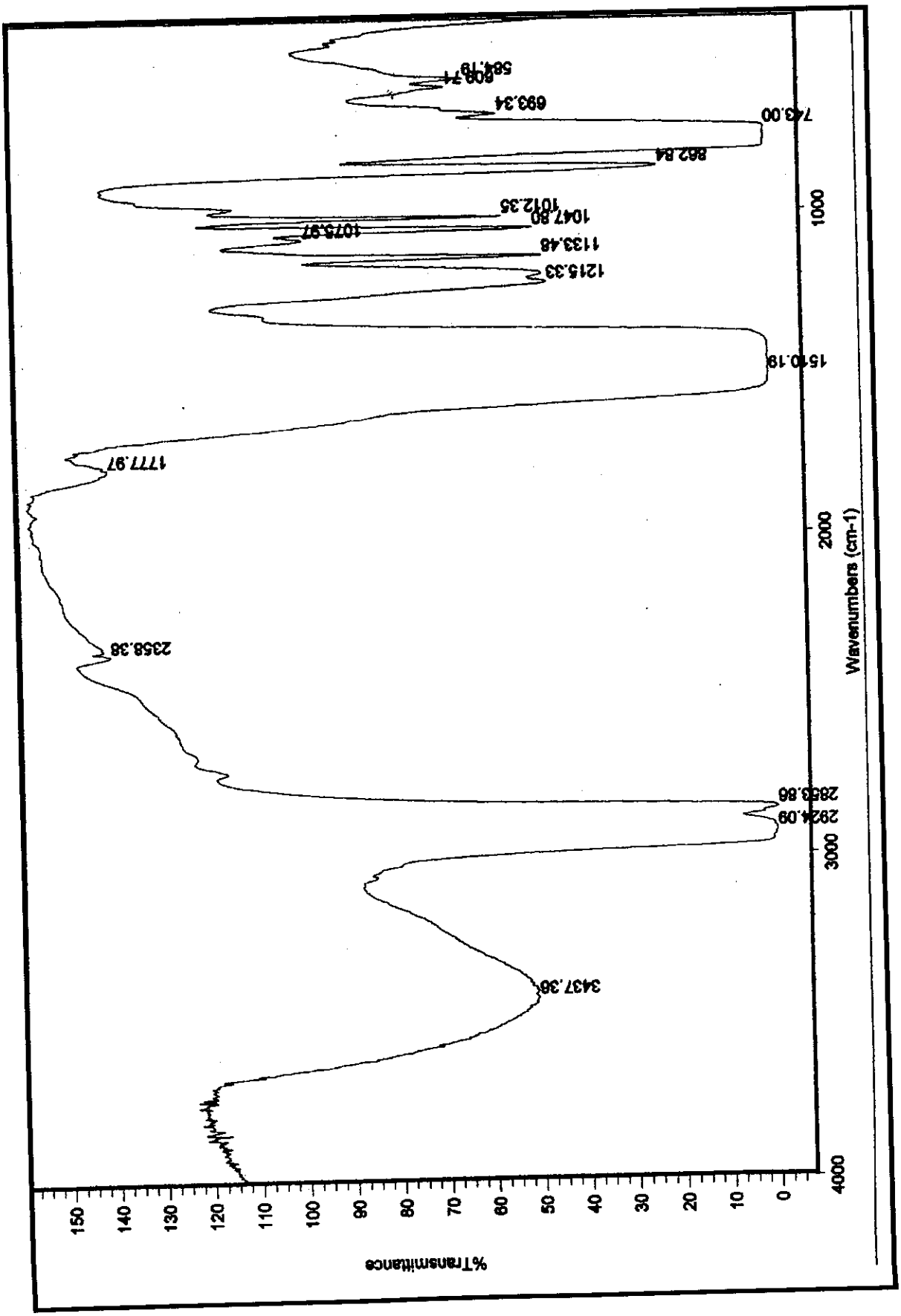

Figure (12) : FTIR Chart of Imported additive